waveformns. In two-dimensional display optics, these forms are variations in the luminance and chrominance channels as a function of space. However, it is believed that when comparing the binocular disparities to form depth perception, the human brain only processes the longer wavelengths.

[0081] Thus, if a first two-dimensional image is displayed to overlap a second spacially separated coterminous second image with a different luminance, or different background luminance, this limitation of human cerebral processing causes a change in the binocular disparity perceived with the resultant image being formed at a point intermediate the image planes.

BRIEF DESCRIPTION OF DRAWINGS

[0082] Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

[0083] **FIG. 1** shows schematic exploded cross sectional view of a display in accordance with a preferred embodiment of the present invention;

[0084] **FIG. 2** shows a perspective view of the embodiment shown in **FIG. 1**;

[0085] **FIG. 3** shows the luminance distribution of a two layer display in accordance with a preferred embodiment of the present invention;

[0086] **FIG. 4**(*a-d*) shows the luminance distribution of a two layer display in accordance with a further embodiment of the present invention;

[0087] **FIG. 5** shows an enlarged representative of a portion of the display shown in **FIG. 1**, and

[0088] **FIG. 6** shows a refractor incorporated in an embodiment of the present invention shown in **FIG. 1**.

BEST MODES FOR CARRYING OUT THE INVENTION

[0089] The **FIGS. 1-4** illustrate preferred embodiments of the present invention in which a display **(1)** capable of displaying a variable depth image **(2)** is composed of a plurality of transparent imaging screens in the form of LCD screens **(3)**, parallel to, but spaced apart from each other and to a rear display screen **(4)** provided with a backlight **(5)**. It should be apparent to one skilled in the art that a number of alternative display technologies may be utilised in place of the LCD screens. Furthermore, although **FIG. 1** shows a single screen **(3)** in front of the rear display **(4)** for the sake of clarity and convenience, any number of additional (at least partially transparent) imaging screens **(3)** may be incorporated. Such displays provide a three dimensional quality the scene viewed by an observer, as described in the applicants co-pending patents PCT No. PCT/NZ98/00098 and PCT/NZ99/00021, incorporated by reference herein.

[0090] Although, as previously stated, the present invention is not specifically restricted to the use of Liquid Crystal Display screens, nevertheless, this type of display technology does posses many beneficial attributes to lend itself to use in the applicant's displays. By way of a brief overview of LCDs, there are two main types of Liquid Crystal Displays used in computer monitors, passive matrix and active matrix. Passive-matrix Liquid Crystal Displays use a simple grid to supply electrical charge to a particular pixel on the display. The grids made from a transparent conductive material (usually indium tin oxide), are formed using two glass layers called substrates, one provided with columns, the other with rows.

[0091] The rows or columns are connected to integrated circuits that control when a charge is applied to a particular column or row. The liquid crystal material is sandwiched between the two glass substrates, and a polarizing film is added to the outer side of each substrate.

[0092] A pixel is defined as the smallest resolvable area of an image, either on a screen or stored in memory. Each pixel in a monochrome image has its own brightness, from 0 for black to the maximum value (e.g. 255 for an eight-bit pixel) for white. In a colour image, each pixel has its own brightness and colour, usually represented as a combination of red, green and blue intensities.

[0093] To activate a particular pixel, the integrated circuit applies a charge to the relevant column of one substrate whilst grounding the corresponding row on the other substrate. The voltage applied to the intersection of the relevant row and column designating the pixel untwists the liquid crystals at that pixel.

[0094] However, the passive matrix system has significant drawbacks, notably slow response time and imprecise voltage control. Response time refers to the Liquid Crystal Displays ability to refresh the image displayed. Imprecise voltage control hinders the passive matrix's ability to influence a single pixel at a time. When voltage is applied to untwist one pixel, the pixels around it also partially untwist, which makes images appear fuzzy and lacking in contrast.

[0095] Active-matrix Liquid Crystal Displays depend on thin film transistors (TFT). Thin film transistors are tiny switching transistors and capacitors arranged in a matrix on a glass substrate. To address a particular pixel, the appropriate row is switched on, and then a charge is sent down the correct column. Since all of the other rows that the column intersects are turned off, only the capacitor at the designated pixel receives a charge. The capacitor is able to hold the charge until the next refresh cycle. Furthermore, if the amount of voltage supplied to the crystal is carefully controlled, it can be made to untwist only enough to allow some light through. By doing this in very exact, very small increments, Liquid Crystal Displays can create a grey scale. Most displays today offer 256 levels of brightness per pixel.

[0096] A Liquid Crystal Display that can show colours must have three subpixels with red, green and blue colour filters to create each colour pixel. Through the careful control and variation of the voltage applied, the intensity of each subpixel can range over 256 shades. Combining the subpixels produces a possible palette of 16.8 million colours (256 shades of red×256 shades of green×256 shades of blue).

[0097] Liquid Crystal Displays employ several variations of liquid crystal technology, including super twisted nematics, dual scan twisted nematics, ferroelectric liquid crystal and surface stabilized ferroelectric liquid crystal. There are also emissive technologies such as Organic Light Emitting Diodes which are addressed in the same manner as Liquid Crystal Displays.